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Stuart Webb

Measuring the Ability to Learn Words

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Yosuke Sasao
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Measuring the Ability to Learn Words
Yosuke Sasao

Introduction

A number of attempts have been made to create and validate vocabulary tests. Established vocabulary tests include the Vocabulary Levels Test (Beglar & Hunt, 1999; Nation, 1983, 1990; Schmitt, Schmitt, & Clapham, 2001; Webb, Sasao, & Ballance, 2017), the Vocabulary Size Test (Beglar, 2010; Nation & Beglar, 2007), the Word Associates Test (Read, 1993, 1998; Schmitt, Ng, & Garra, 2011), the Eurocentres Vocabulary Size Test (Meara & Buxton, 1987; Meara & Jones, 1988), the Vocabulary Knowledge Scale (Wesche & Paribakht, 1996), CATSS (Laufer, Elder, Hill, & Congdon, 2004; Laufer & Goldstein, 2004), Lex 30 (Fitzpatrick & Clenton, 2010; Meara & Fitzpatrick, 2000), and the Integrated Diagnostic Test of Vocabulary Size and Depth (Ishii & Schmitt, 2009).

These tests are of great value because they reveal a learner’s current level of vocabulary knowledge. The test results may indicate how many words or which aspect of a word need to be learned to achieve a particular goal. A pretest and posttest design may be used to assess vocabulary growth over a period of time, or as the result of a particular teaching/learning method. However, existing vocabulary tests do not aim at indicating how learners can become efficient in vocabulary learning. There is a dearth of research on developing and validating tests that will help reveal learners’ ability to learn words and provide them with diagnostic information on how they can improve their vocabulary learning strategies. There is a need for new diagnostic tests measuring vocabulary learning ability; that is, how efficiently words can be learned.

This chapter discusses the notion of vocabulary learning ability (VLA) and gives a brief description of two tests measuring VLA; namely, the Word Part Levels Test and the Guessing from Context Test.

Critical Issues and Topics

What Is Vocabulary Learning Ability?

Vocabulary learning ability (VLA) is the ability necessary to facilitate L2 vocabulary learning. It determines how efficiently words are learned and predicts the rate of vocabulary growth. VLA refers to how well a learner can actually use vocabulary learning strategies.
such as guessing from context, direct learning of vocabulary, word part knowledge, and dictionary use. This is different from how well a learner knows vocabulary learning strategies. The distinction between use and knowledge is important, because teachers often have difficulty spending sufficient time on vocabulary instruction within limited class hours, and thus a learner may not be able to use the strategies effectively even if they are known explicitly (Nation, 2013, p. 518).

VLA may be taken as one of the learner factors that affect vocabulary learning (e.g., individual learner differences in knowledge, effort, strategies), because different learners are assumed to have different levels of VLA. VLA is different from other learner factors because it is teachable. Thus, research on VLA will be readily applicable to teaching in normal classroom settings. In contrast, L1 knowledge, including cognates and loanwords, may be hard to teach for instructors with different L1 backgrounds from their students. Other individual differences such as personality, learning styles, and motivation may also affect vocabulary learning, but they are also hard to teach.

One major VLA component is the skill of guessing the meanings of unknown words from context. Although correctly guessed words may not always lead to learning, being skillful at guessing is likely to contribute to vocabulary growth because it allows better text comprehension and a larger amount of input processing (Perfetti, 2010; Pulido & Hambrick, 2008). In addition, instruction seems to have a positive effect on the development of the guessing skill (Fukkink & de Glopper, 1998; Kuhn & Stahl, 1998; Walters, 2004). The effectiveness of instruction may vary according to proficiency level. Walters (2006) found that less proficient learners benefited most from general strategy instruction (presenting a general rule for guessing followed by practice), while more advanced learners benefited most from context instruction (making learners aware of specific types of context clues).

Another important VLA component is deliberate word-pair learning, or learning from word cards, which may be seen as a complementary activity to incidental vocabulary learning. Intentional learning enables learners to focus on particular words that meet their needs and to control how often the words are encountered so that they may be effectively stored in memory. Research shows that deliberate, decontextualized vocabulary learning may lead to implicit knowledge which is required for normal language use (Elgort, 2007), and it may also result in gains in knowledge of more than form-meaning connections including grammatical functions and associations (Webb, 2009). Deliberate word-pair learning may be facilitated by flash card software, because it may help control for intervals of repetition, learning modes (productive vs. receptive, and recall vs. recognition), and the sequencing of items (Nakata, 2011).

There is also plenty of research evidence that shows the positive effects of dictionary use on vocabulary learning (Chun & Plass, 1996; Hill & Laufer, 2003; Hulstijn, Hollander, & Greidanus, 1996; Knight, 1994; Laufer & Hill, 2000; Luppescu & Day, 1993; Peters, 2007). However, some learners may have difficulty locating the appropriate meaning of a word that is looked up in a dictionary. Tono (1988) examined the skill of dictionary use by Japanese university students with a low to intermediate level of proficiency by measuring multiple aspects of dictionary use, including pronunciation, spelling, part of speech, meaning, reference speed, derivatives, synonyms, usage, and social background. The results showed that the participants were successful in deriving the appropriate meaning of 67% to 71% of the words that were looked up in a dictionary. The results also showed that the participants performed better for some aspects of dictionary use (e.g., success rate of finding inflected forms = 78%) than others (e.g., success rate of finding derivatives = 46%). Fraser (1999) examined eight Francophone university students’ strategies for dealing with unknown words.
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while reading, and found that the participants were successful in deriving the appropriate meaning of 78% of the words that were looked up in a dictionary. These studies indicate that there is still room for improving learners’ skill of dictionary use.

In addition to these skills (guessing from context, deliberate word-pair learning, and dictionary use), increasing some types of knowledge may also contribute to more effective vocabulary learning. Word part knowledge plays an important role in facilitating vocabulary learning. First, knowledge of word parts can help learners infer the meaning of an unknown word that is derived from an already known word within the same word family. For example, the meaning of unlucky may be transferred easily from knowledge of the word lucky when a learner knows the prefix un- and sees the relationship between these two words. Second, corpus-based research (Nagy & Anderson, 1984) shows that a morphologically basic word has an average of 1.57 to 3.22 derivatives depending on the definition of a derivative, and lower-frequency words tend to have a larger number of semantically transparent derivatives. Third, empirical studies with L2 learners of English have shown that knowledge of word parts moderately or strongly correlates with vocabulary size (Ishii & Schmitt, 2009; Mochizuki & Aizawa, 2000; Qian, 1999; Schmitt & Meara, 1997). Fourth, Wei (2015) found that the use of word part knowledge was more effective in word retention than the keyword method for Chinese learners of English. Finally, Schmitt and Zimmerman (2002) found that learners might not acquire word part knowledge automatically through exposure, arguing that word parts need to be learned explicitly, especially for productive use. This indicates that using word part knowledge helps expand vocabulary knowledge, and there is a need for helping learners gain knowledge of word parts.

Phonological knowledge may also facilitate vocabulary learning. Research findings indicate that while totally unfamiliar words are largely dependent on phonological short-term memory, for learners with larger vocabulary sizes existing long-term lexical knowledge becomes more important in vocabulary learning than short-term memory (Ellis & Sinclair, 1996; Gathercole & Baddeley, 1989; Masoura & Gathercole, 1999; Papagno, Valentine, & Baddeley, 1991; Service, 1992). Gathercole (1995) found that English-like nonsense words (e.g., defermication) were easier for L1 English children to remember than non-English-like words (e.g., perplisteronk). Further analysis showed that short-term memory (as measured by tests of digit span and one- and three-syllable span) was more closely related to non-word repetition accuracy for the non-English-like than for the English-like words. Cheung (1996), in a study with Hong Kong 7th graders learning English, found that phonological short-term memory as measured by non-word repetition was related to vocabulary acquisition only for those with a small English vocabulary size. Masoura and Gathercole (2005) found that Greek children’s speed of learning English words in a paired-associate learning task was strongly affected by their current English vocabulary knowledge. They argued that learners with considerable familiarity with the L2 benefit from the use of existing knowledge representations. Gathercole, Service, Hitch, Adams, and Martin (1999) argue that long-term memory has an impact on short-term memory, because it can help to reconstruct words at the point of retrieval by constraining possible sequences of sounds with reference to phonotactic regularity.

Another type of knowledge that may contribute to effective vocabulary learning is knowledge of phonics: the relationships between spelling and pronunciation. Research (e.g., Bradley & Huxford, 1994; Rosenthal & Ehri, 2008) has shown that orthographic and phonological knowledge is strongly related to each other. While the English language uses phonograms, there seems to be a complex relationship between the English sounds and the spellings that they represent. However, knowledge of phonics seems to facilitate vocabulary learning.
Abbott (2000) showed that the English sound-letter relationships were highly predictable (75% or greater generalization reliability), indicating the effectiveness of phonic knowledge in vocabulary learning. Bruck, Treiman, Caravolas, Genesee, and Cassar (1998) found that children with phonics instruction produced more accurate word spellings than children without phonics instruction when asked to learn and spell a list of words; in addition, children with phonics instruction produced more conventional and phonologically acceptable patterns for the spellings of nonsense words. Similar results were obtained by Roberts and Meiring (2006).

To sum up, VLA refers to the ability to increase vocabulary learning and may include at least six types of knowledge and skills:

1. Guessing from context,
2. Learning from word cards,
3. Dictionary use,
4. Knowledge of word parts,
5. Knowledge of a sound system, and
6. Knowledge of sound-spelling relationships.

As an initial attempt to make VLA tests, this chapter focuses on guessing from context and knowledge of word parts. The skill of guessing from context plays a critical role in vocabulary learning. It may be a major source of vocabulary learning through reading and listening for both L1 (Jenkins, Stein, & Wysocki, 1984; Nagy, Anderson, & Herman, 1987; Nagy, Herman, & Anderson, 1985; Shu, Anderson, & Zhang, 1995) and L2 acquisition (Brown, Waring, & Donkaewbua, 2008; Day, Omura, & Hiramatsu, 1991; Dupuy & Krashen, 1993; Horst, Cobb, & Meara, 1998; Hulstijn, 1992; Pitts, White, & Krashen, 1989; Waring & Takaki, 2003). For L2 acquisition, the guessing skill may become more important for mid- and low-frequency words, because teachers may have little time to deal with the large number of unknown words in the classroom, and so students may need to learn these words on their own while reading or listening to the texts that are of interest to them. In addition, guessing from context is the most frequent and preferred strategy when learners deal with unknown words in context (Cooper, 1999; Fraser, 1999; Paribakht & Wesche, 1999). However, the success rate for deriving the appropriate meanings of words encountered in context is low: 12% to 33% in one study (Parry, 1991) and 25.6% in another (44.2% if partially correct guesses were allowed) (Nassaji, 2003). Taken together, improving the skill of guessing has the potential to facilitate vocabulary learning through reading or listening, because learners rely on the guessing strategy most frequently when dealing with unknown words in context and good guessers may be more likely to find opportunities to derive the appropriate meanings of unknown words and learn them.

Knowledge of word parts also contributes to vocabulary learning. Research (Anglin, 1993; Goulden, Nation, & Read, 1990; Nagy & Anderson, 1984) shows that about half of English words are morphologically complex. In addition, word part knowledge may help learners check whether an unknown word has been successfully guessed from context; in other words, integration of information from context and word parts helps to make guessing more successful (Mori, 2002; Mori & Nagy, 1999; Nagy & Anderson, 1984; Nation, 2001). Word meanings may not easily be determined by a single source of information, because contextual clues are not always sufficient for deriving the meanings of unknown words (Beck, McKeown, & McCaslin, 1983; Schatz & Baldwin, 1986) and word part analysis is sometimes misleading (e.g., bother is not both + –er) (Bensoussan & Laufer, 1984).
Why Is It Important to Measure VLA?

Very few attempts have been made to develop and validate tests measuring how efficiently words can be learned. Existing vocabulary tests aim to measure how many words are known (e.g., the Vocabulary Levels Test; Nation, 1983, 1990) or how well a word is known (e.g., the Word Associates Test; Read, 1993, 1998). These tests, however, do not indicate how learners can improve their ability to learn vocabulary. This makes it difficult to provide learners with diagnostic information on what is needed to become more efficient in vocabulary learning. A lack of tests measuring VLA indicates a need for new approaches to vocabulary assessment. These tests may provide learners with specific information on how to improve their VLA.

VLA tests will benefit teachers because they may diagnose their students’ vocabulary learning weaknesses and provide information that can be used to improve their learning skills. The tests will reveal which types of knowledge and strategies specifically need to be learned in order to become more proficient in vocabulary learning. Since teachers have limited time to deal with low-frequency words in class, it is important to help students become more efficient in vocabulary learning strategies so that they can effectively learn these words on their own.

VLA tests may also help to determine a critical threshold after which vocabulary learning becomes significantly easier. An investigation into the relationship between learners’ performance on VLA tests and their vocabulary size may indicate a general tendency that a learner with a particular vocabulary size has a particular level of VLA. If the goal of vocabulary learning were set at developing a vocabulary size of 8,000 words, which might be necessary to achieve the 98% coverage of written text (Laufer & Ravenhorst-Kalovski, 2010; Nation, 2006), then the VLA level of learners with a vocabulary size of 8,000 words might be taken as the threshold levels for efficient vocabulary learning.

VLA tests may also contribute to a better understanding of L2 vocabulary learning. Earlier studies have investigated the relationship between learners’ existing knowledge/strategies and vocabulary learning; for example, existing phonological knowledge was found to relate to vocabulary learning (e.g., Hulme, Maughan, & Brown, 1991) and existing word part knowledge also has a positive relationship with learning words (e.g., Schmitt & Meara, 1997). However, few attempts have been made to collectively approach the notion of VLA; that is, previous research has focused only on specific areas of learning proficiency and VLA remains to be synthesized from a theoretical and practical perspective. VLA tests may be useful in approaching this issue empirically and may shed new light on the theory of L2 vocabulary acquisition.

How Can VLA Be Measured?

The purpose of VLA tests is to diagnose a learner’s aptitude for learning words. A diagnostic test should identify specific areas of strengths and weaknesses in language ability and provide detailed and prompt feedback to teachers and learners (Alderson, 2005; Alderson, Clapham, & Wall, 1995; Bachman, 1990; Bachman & Palmer, 1996). To this end, VLA tests will have the following features in common:

- The tests consist of multiple components specified in content specifications. Examining different aspects of an individual VLA separately has at least two advantages over measuring a single aspect. First, by isolating and measuring different aspects of knowledge
and skills necessary to learn word effectively, a test can provide learners with more precise information about their strengths and weaknesses. Teachers may then be able to offer a more effective vocabulary teaching program that caters to their students’ needs. Second, it raises awareness of VLA for both teachers and students. Teaching VLA may be challenging especially for native speakers because they have rarely learned the skills necessary to learn words explicitly.

- The tests are easy to complete and grade so that clear feedback can be given soon after administration of the test to students. Immediate feedback is desirable because learners may still remember the reasons for their responses if they receive the feedback soon after completing the test. This may allow them to make use of the feedback in order to develop their knowledge and skills (Alderson, 2005).

Based on these criteria, the Word Part Levels Test (WPLT) and the Guessing from Context Test (GCT) were created. Both tests have three sections each measuring different aspects of an individual VLA, and are written in multiple-choice format. The tests are freely available at http://ysasaojp.info/.

The Word Part Levels Test (WPLT)

The WPLT aims to measure knowledge of English affixes and provide diagnostic information on a learner’s gaps in affix knowledge to facilitate current and future vocabulary learning. The test consists of three sections each measuring different components of receptive affix knowledge: form, meaning, and use (Bauer & Nation, 1993; Nation, 2001; Tyler & Nagy, 1989). The form section measures the ability to recognize the written form of an affix (e.g., non– and –ful are affixes while kno– and –ack are not). Here are two example items of the form section.

1. (1) non– (2) kno– (3) spo– (4) orn–
2. (1) –rse (2) –ack (3) –ful (4) –uin

For the meaning section, test takers must choose the closest meaning of the target affix (e.g., the meanings of the affixes dis– and –ist are “not” and “person”, respectively). For each item, two example words containing the target affix are provided. Here are two example items of the meaning section.

3. dis– (disbelieve; dissimilar) 4. –ist (specialist; artist)
   (1) not (1) against
   (2) person (2) person
   (3) new (3) two
   (4) main (4) not

The use section measures knowledge of the function of an affix (e.g., en– has the function of making a verb, while –ness has the function of making a noun). For each item, two example words containing the target affix are provided. Each item had a fixed set of four options: noun, verb, adjective, and adverb. Here are two example items of the use section.
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The WPLT includes a total of 118 affixes (42 prefixes and 76 suffixes) which appear in more than one word in the most frequent 10,000 word families in the British National Corpus (BNC) word lists developed by Nation (2004) (available at www.victoria.ac.nz/lals/staff/paul-nation.aspx). Rasch analysis was used to determine the item difficulty levels of the affixes according to the responses of 1,348 learners and categorize the affixes into three different levels (beginner, intermediate, and advanced). There are 40, 39, and 39 affixes in the beginner, intermediate, and advanced levels, respectively. The WPLT has three difficulty levels rather than a single comprehensive form, because (1) it allows teachers to choose a test at an appropriate level for their students; (2) it provides teachers and students with a manageable number of word parts for a course; and (3) it proposes the effective order of learning affixes (see Sasao & Webb, 2017, for a detailed explanation about the test development procedure).

The Guessing From Context Test (GCT)

The purpose of the GCT is to measure the ability to guess the meanings of unknown words from context. The GCT has two equivalent versions each with 20 items. Each item in the GCT has a 50-to-60-word passage and three questions to examine three different steps in guessing from context (Figure 27.1). The three question types are part of

[Passage]
Cats have a good nose for food. Many cats smell food and then (1) walk away without even trying it. Like a wine _candintock_ (2) who only has to smell the wine to know how good it is, (3) a cat can learn all it wants to know without actually eating the food.

[Question 1] Choose the part of speech of the bold, underlined word.
(1) Noun  (2) Verb  (3) Adjective  (4) Adverb

[Question 2] Choose the word or phrase that helps you to work out the meaning of the bold, underlined word.
(1) walk away without even trying it
(2) who only has to smell the wine to know how good it is
(3) a cat can learn all it wants to know without actually eating the food

[Question 3] Guess the meaning of the bold, underlined word.
(1) consumer
(2) specialist
(3) seller

Figure 27.1  Example items of the GCT
speech, contextual clue, and meaning. These three aspects of the guessing from context strategy were based on Clarke and Nation’s (1980) guessing procedure which is perhaps the best-known version of the guessing strategy. Using three different types of questions to measure three different components of the strategy make it possible to provide specific information about where a learner’s strengths and weaknesses lie. The part of speech question examines the ability to identify the part of speech of the target word. Every item had the following four options: noun, verb, adjective, and adverb. The contextual clue question measures the ability to find a discourse clue which can be used to help a learner guess the meaning of the unknown word. Each passage has one contextual clue, and the different types of clues were identified in earlier research (e.g., Ames, 1966). The meaning question measures the ability to derive the meaning of the unknown word. The correct answer is the option that best fits to the context and the meaning of the original word. The two distractors are of the same part of speech as the correct answer but contain irrelevant or lack important meaning (see Sasao & Webb, 2018 for a detailed explanation about the test development procedure).

How Can Feedback Be Provided to Learners?

Diagnostic feedback needs to be easy to understand and clearly reveal a learner’s strengths and weaknesses in the VLA. For easier interpretation of the scores, the percentage of correctly answered items for each section may be expressed in a bar graph because the information is intuitively interpretable. Figure 27.2 illustrates an example score report to a learner who took the GCT and got 90%, 50%, and 50% for the part of speech, contextual clue, and meaning sections, respectively. This indicates that while this learner demonstrated good knowledge of part of speech, his weakness lies in finding contextual clues and deriving the meaning based on that information; thus, this learner should focus on the learning of contextual clues to potentially improve the guessing skill. (For a proposal of the level classification of the guessing skill, see Sasao & Webb, 2018.)

Figure 27.2 Example score report (WPLT)
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Future Directions

The GCT and the WPLT make a number of future studies of VLA possible. First, the effects of teaching may be investigated with the GCT and the WPLT. Previous studies on the guessing skill (Fukkink & de Glopper, 1998; Kuhn & Stahl, 1998; Walters, 2006) generally indicate that teaching may result in improvement of the guessing skill but are not consistent with the relative efficacy of teaching methods. One of the reasons for this inconsistency is that only one aspect of guessing (deriving the meaning of an unknown word) was measured. The GCT measures three aspects of the guessing skill, and thus may determine effective teaching methods to a particular aspect of the guessing skill. For example, teaching a variety of contextual clues might be effective because learners may increase discourse knowledge which contributes to the improvement of the guessing skill. Teaching a general strategy (Bruton & Samuda, 1981; Clarke & Nation, 1980; Williams, 1985) might also be effective because learners may become aware that integrating grammar information (part of speech of an unknown word) and discourse information (contextual clues) is important. Cloze exercises might also be effective because they provide learners with the opportunity to do a lot of guessing, but might be effective only when learners know the majority of words in the context so that the target words may be guessable. Research looking at different approaches to improving guessing might indicate the best approaches to improving this specific VLA. Moreover, research might also make it possible to identify where learners find difficulty and choose the appropriate teaching method that is most effective to improve their weaknesses.

The development of the WPLT will also make it possible to investigate the effects of teaching on word part knowledge. Research with L1 children (e.g., Baumann et al., 2002) indicates that teaching has a positive effect on the improvement of word part knowledge; however, little is known about L2 learners. Using the WPLT in a pretest, intervention, posttest quasi-experimental design may contribute to determining the relative efficacy of teaching methods. Different approaches to learning affixes might be compared to determine which is most effective. For example, knowledge of affix form and meaning might effectively be gained by providing some example words with a particular affix rather than simply providing the relationships between affix form and meaning because affixes do not exist on their own. Knowledge of affix use might be effectively gained when learners encounter sentences that include a word with a particular affix rather than encountering only an example word that includes the affix.

Second, future research may also investigate the interrelationships among vocabulary size, word part knowledge, and guessing from context. This will reveal the combined effect of the guessing skill and word part knowledge on vocabulary size. It has been claimed that both the guessing skill and word part knowledge play an important role in vocabulary learning (e.g., Nation, 2013), but little is known about the extent to which these two VLA components contribute to vocabulary size. This may be effectively investigated using the WPLT and the GCT.

Third, creating tests measuring other aspects of VLA such as the skill of dictionary use and phonological knowledge may be useful both for research and education. Future research may indicate the relative efficacy of some aspects of VLA over others. This may be different according to learners’ proficiency level, L1 background, age, gender, learning style, and so on. Having a variety of VLA tests may be useful to teachers because this will help them determine which components of VLA they should deal with in class and offer a more effective teaching program.
Finally, web-based VLA tests may be useful to develop (Alderson, 2005; Hughes, 1989). Currently, the GCT and the WPLT are available only in a paper-based format, but web-based tests will allow learners to take the tests anytime and anywhere if they have access to the internet. They can receive immediate feedback on their scores when they finish the tests. Preferably, when the tests are completed the scores are automatically calculated and are reported to learners using a bar graph which clearly indicates their strengths and weaknesses. Online tests might also have the function of recording the response time for each item so that teachers could identify learners who took the tests without thinking carefully (too short response time) or those who relied on external resources such as a dictionary (too long response time). A recent study (Mizumoto, Sasao, & Webb, 2019) involved the development and evaluation of a computerized adaptive testing (CAT) version of the WPLT and found that the CAT-WPLT produced the same or greater reliability estimates than the original WPLT with a smaller number of items. This indicates that CAT provides an effective and efficient way of diagnosing learners’ VLA, and future research may develop and evaluate the tests of other components of VLA using the CAT system.

Further Reading


Chapter 7 of this book proposes ways in which students may become more effective autonomous learners of vocabulary.


This paper discusses some of the gaps in vocabulary assessment and the importance of making new vocabulary tests to fill these gaps.

Related Topics

Computer adaptive testing, deliberate vocabulary learning, incidental vocabulary learning, language assessment, vocabulary learning strategies

References


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